

Appl. No : 10/614,489  
Filed : July 3, 2003

#### REMARKS

With this Amendment, Claims 1-15 are pending in the present application, and Claims 1, 2 and 9 are amended.

#### Anticipation under 35 U.S.C. § 102

Claims 1-4, 9 and 10 were rejected under 35 U.S.C. § 102(b) as being anticipated by Summerfelt et al. (US 5781404). Applicant respectfully disagrees with the Examiner's characterization of the prior art, and requests reconsideration of the rejections in view of the above amendments and the following remarks.

Specifically, Applicant notes that Summerfelt does not teach "forming a nucleation layer over the electrode material, wherein the nucleation layer consists essentially of a metal" as recited in Claim 1 as amended.

Summerfelt et al. teaches a method of reducing the leakage current of a capacitor by providing additional layers of dielectric material between first and second electrodes. To accomplish this, Summerfelt teaches placing dielectric "buffer layers" (32, 36, 38) of materials (such as strontium titanate) having moderate dielectric constants above and below a BST layer. Summerfelt teaches that the buffer layer materials have substantially lower leakage-current densities than a BST layer. Summerfelt teaches an alternative embodiment in which a layer of BST (34) is surrounded by a thin-film of strontium titanate (38).

The Examiner suggests that Summerfelt's TABLE 2 teaches that the buffer layers (32, 36, 38) can be formed of Nb or Mn instead of ST. However, Applicants respectfully submit that Summerfelt does not, in fact, teach that the buffer layer is "formed of" either Mn or Nb alone. Applicants submit that the right-hand column of TABLE 2 of Summerfelt states that "other alternate examples" of a "surrounding dielectric buffer layer" material include "relatively low leakage-current-density acceptor... and/or donor... doped perovskite, ferroelectric, or high-dielectric constant oxides (e.g. (Sr, Ca, Mg)(Ti, Zr, Hf)O<sub>3</sub>)"

Mn is listed in TABLE 2 as one of 13 possible elements for use as an acceptor dopant in an oxide layer. Similarly, Nb is listed as one of 18 alternative elements for use as a donor dopant in the oxide layer. Thus, while Summerfelt teaches that the buffer layer can **include** Mn or Nb as elements in a layer of an oxide compound, there is no suggestion in Summerfelt et al to provide a thin film structure with a nucleation layer consisting essentially of a metal.

By contrast, Applicants' Claim 1 as amended recites, *inter alia*, "forming a nucleation layer over the electrode material, wherein the nucleation layer consists essentially of a metal." Applicants respectfully submit that the fact that Summerfelt lists Mn and Nb in a laundry list of possible elements to be combined into an oxide compound for a "buffer layer" is not suggestive of the limitations recited in Applicants' Claim 1 as amended. Therefore, Applicants respectfully submit that Claim 1 is not anticipated by Summerfelt et al.

Additionally, with regard to dependent Claims 2-4, Applicants respectfully submit that Summerfelt does not teach or suggest the unique combinations of limitations recited therein. For at least these reasons, Applicants respectfully request that the rejections of Claims 1-4 be withdrawn.

Claims 9 and 10 were also rejected under 35 U.S.C. § 102(b) as being anticipated by Summerfelt et al. As discussed above, Summerfelt merely teaches the formation of an oxide "buffer layer" that could *include* Nb or Mn in an oxide compound with any number of other elements. Therefore, Applicant respectfully submits that Claim 9, which recites *inter alia*: "forming a nucleation layer over the first electrode material; wherein the nucleation layer consists essentially of a metal selected from the group consisting of: Ti, Nb, and Mn," is not anticipated by Summerfelt et al. Therefore, Applicants respectfully request that the rejections of Claims 9 and 10 be withdrawn.

Obviousness under 35 U.S.C. § 103

Claims 5, 6 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Summerfelt et al. in view of Kawahara et al. (US 6,117,482). Applicants traverse the rejections and respectfully disagree with the Examiner's characterization of the cited references.

Applicants respectfully submit that Kawahara does not correct the deficiencies of Summerfelt as discussed above.

Moreover, Applicants respectfully submit that there remains no motivation that would lead one having ordinary skill in the art to make the suggested combination. The Examiner suggests that a person having ordinary skill in the art would be motivated to make the suggested combination "in order to provide a more uniform and stable BST film." However,

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there is no suggestion *in the prior art* that the suggested combination would result in such improvements.

Furthermore, Applicants respectfully disagree with the characterization of the limitations of Claims 6 and 14 as being merely “optimum or workable ranges.” Applicant submits that a rejection based on “optimum or workable ranges” is inappropriate where the prior art does not teach or suggest the desirability of the result achieved. As discussed in MPEP § 2144.05, “[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.” In re Antonie, 559 F.2d 618, 195 U.S.P.Q. 6 (CCPA 1977). Thus, for a rejection to be made based on “optimum or workable ranges,” the prior art must first identify the result which the variable achieves.

Applicants submit that the prior art of record does not identify deposition rate as a variable affecting increased uniformity of the crystal orientation of a BST film as taught by some embodiments in the present application. Thus, without disclosing this desired result, Kawahara cannot be used to reject the claims on the basis that the parameters affecting this result are merely “optimum or workable” ranges that would be known to one of skill in the art.

Thus, for at least the above reasons, Applicants respectfully request that the rejections of Claims 5, 6 and 14 be withdrawn.

Claims 7, 8, 11-13 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Summerfelt et al. in view of Ueda (US 6,285,051). Applicants traverse the rejection and respectfully disagree with the Examiner’s characterization of the cited references.

Applicants respectfully submit that Ueda does not correct the deficiencies of Summerfelt as discussed above, and for at least the above reasons, Applicants respectfully request that the rejections of Claims 7, 8, 11-13 and 15 be withdrawn.

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CONCLUSION

The undersigned has made a good faith effort to respond to all of the rejections and objections in the present application and to place the claims into condition for allowance. Nevertheless, if any issues remain which can be resolved by telephone, the Examiner is respectfully requested to call Applicant's representative at the number indicated below in order to resolve such issues promptly.

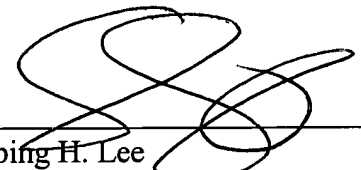
Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: \_\_\_\_\_

7-22-04

By: \_\_\_\_\_

  
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